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भाग 3 ढलाई द्वारा उत्पादित साकेटों की विशिष्ट अपेक्षाएं

Indian Standard

SOCKETS FOR WIRE ROPES FOR GENERAL PURPOSES

PART 3 SPECIAL REQUIREMENTS FOR SOCKETS PRODUCED BY CASTING

UDC 621·827·174 : 677·721

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

December 1993 **Price Group 2**

Wire Ropes and Wire Products Sectional Committee, HMD 10

NATIONAL FOREWORD

This Indian Standard which is identical to ISO 3189/3 : 1985 'Sockets for wire ropes for general purposes — Part 3 Special requirements for sockets produced by casting' issued by International Organization for Standardization (ISO), was adopted by the Bureau of Indian Standards on the recommendation of the Wire Ropes and Wire Products Sectional Committee, (HMD 10) and approval of the Heavy Mechanical Engineering Division Council.

This standard has been issued in several parts. The other parts of this Indian Standard are:

IS 13902 (Part 1)	Sockets for wire ropes for general purposes : Part 1 General Characteristics and conditions of acceptance
IS 13902 (Part 2)	Sockets for wire ropes for genaral purposes : Part 2 Special requirements for sockets produced by forging or machined from the solid

The text of ISO standard has been approved for publication as Indian Standard without deviations. Certain conventions are, however not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use full stop (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of equivalence*
ISO 261 : 1973	IS 4218 (Part 2) : 1972 ISO Metric screw threads : Part 2 Diameter pitch combination (*first revision*)	Technically Equivalent
ISO 965/1 : 1980	IS 4218 (Part 4) : 1976 ISO Metric screw threads : Part 4 Tolerancing system (*first revision*)	Technically Equivalent
ISO 965/2 : 1980	IS 4218 (Part 6) : 1978 ISO Metric screw threads : Part 6 Limits of sizes for commercial bolts and nuts (diameter range 1 to 52 mm) (*first revision*)	Technically Equivalent
ISO 965/3 : 1980	IS 4218 (Part 5) : 1979 ISO Metric screw threads : Part 5 Tolerances (*first revision*)	Technically Equivalent
ISO 3189/1 : 1985	IS 13902 (Part 1) : 1993 Sockets for wire ropes for general purposes : Part 1 General characteristics and conditions of acceptance	Identical
ISO 3189/2 : 1985	IS 13902 (Part 2) : 1993 Sockets for wire ropes for general purposes — Part 2 Special requirements for sockets produced by forging or machined from the solid	Identical

The concerned technical committee has reviewed the provisions of ISO 643 and ISO 4986 referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard.

For the purpose of deciding, whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SOCKETS FOR WIRE ROPES FOR GENERAL PURPOSES

PART 3 SPECIAL REQUIREMENTS FOR SOCKETS PRODUCED BY CASTING

1 Scope and field of application

This part of ISO 3189 specifies the special requirements for materials, method of manufacture and quality control of sockets produced by casting. The general characteristics, critical dimensions, prototype test requirements, general quality control and conditions of acceptance are dealt with in ISO 3189/1.

2 References

ISO 261, *ISO general purpose metric screw thread — General plan.*

ISO 643, *Steels — Micrographic determination of the ferritic or austenitic grain size.*

ISO 965, *ISO general purpose metric screw thread — Tolerances.*

ISO 3189/1, *Sockets for wire ropes for general purposes — Part 1: General characteristics and conditions of acceptance.*

ISO 3189/2, *Sockets for wire ropes for general purposes — Part 2: Special requirements for sockets produced by forging or machined from the solid.*

ISO 4986, *Magnetic particle inspection of steel castings.*[1]

3 General conditions of acceptance

Sockets shall comply with the requirements of ISO 3189/1 as well as with those in this part of ISO 3189.

4 Materials and heat treatment

4.1 Quality of materials

The steel used shall be produced by the open hearth or electric process, or by oxygen blown process or by any other equivalent process.

Sockets of this type shall be cast from non-alloy or alloy steel which shall meet the following requirements, as determined by a check analysis on a finished socket:

Sulfur, max.	0,050 %
Phosphorus, max.	0,050 %
Combined sulfur and phosphorus content, max.	0,080 %

Non-alloy steels shall have a maximum tensile strength of 600 MPa and an elongation of not less than 14 %. Alloy steels shall have a maximum tensile strength of 750 MPa and an elongation of not less than 15 %.

Within the above limitations, it is the responsibility of the socket-maker to select the steel so that, after any necessary heat treatment (see 4.2), the finished socket meets the performance requirements specified in this part of ISO 3189.

4.2 Heat treatment

Socket bodies and pins shall, if necessary, be heat-treated to ensure that, as quenched, martensitic structures are avoided in the finished socket.

5 Socket manufacture

Sockets complying with this part of ISO 3189 shall be (open) type I or (closed) type II, and shall conform to the critical dimensions specified in ISO 3189/1 (see table 1 and figures 1 and 2). The sockets shall be neatly and cleanly made.

5.1 Bodies

Surfaces of cast steel bodies shall be in a clean, descaled condition and all sharp edges shall be suitably radiused. All flashes or fins produced in manufacture shall be removed.

Minor surface defects may be removed by grinding, provided that the wall thickness at this point is not reduced below the socket-maker's declared minimum wall thickness.

Other small casting defects occurring during manufacture may be rectified by grinding and subsequent welding, provided that the thickness of sound material remaining at the defective point immediately before welding is at least 50 % of the original thickness. Furthermore, the extent of the welded repair, measured in any direction, shall not exceed 1,5 times the thickness of the metal at that point. The recognized method of repair shall comprise the following:

a) thorough and adequate technical control of all stages of the repair;

b) removal of defective metal by chipping or grinding;

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[1] At present at the stage of draft.

c) verification of this removal by radiography, ultrasonics, magnetic flaw detection or dye penetrants;

d) pre-heating the casting to requisite pre-heat temperature immediately prior to welding;

e) filling the excavation with weld metal, the composition of the rod being chosen to give mechanical properties matching those of the casting;

f) grinding the surface of the weld metal to the level of the adjacent metal of the socket;

g) correct reheat treatment of each repaired socket body;

h) verification of crack removal by radiographic or ultrasonic examination.

The pin holes shall be machined in one operation and the centreline of the holes shall be at right angles to the centreline of the socket basket.

5.2 Pins

The pins shall be forged, forged and machined, or machined from the bar, and may be threaded or plain, according to the purchaser's requirements.

The steel used shall comply with the requirements specified in ISO 3189/2.

The length of the plain portion of a threaded type pin shall be such that the nut will tighten against the shoulder of the pin and not against the outside face of the socket.

The threads on pins and associated nuts shall comply with the coarse pitch series, specified in ISO 261, and tolerance class 6g, specified in ISO 965.

A suitable safety device, such as a split cotter pin, shall be provided to prevent nuts accidentally becoming displaced.

6 Special quality control requirements for cast sockets

In addition to the general quality control requirements specified in ISO 3189/1, the following tests shall apply.

6.1 Magnetic flaw or dye penetrant method

Each socket shall be subjected to an approved method of particle crack detection. All external and internal surfaces shall be examined, and cracks, hot tears, rips or other detrimental defects shall not be accepted.

Acceptable levels of defect should be agreed between the purchaser and the manufacturer.

Guidance on acceptable levels is given in ISO 4986.

6.2 Radiographic tests

Radiographic tests shall be carried out. The number of samples shall be in accordance with the following table.

Lot or batch size (Number of sockets)	**Sample size** (Number of sockets)
2 to 8	2
9 to 15	3
16 to 25	5
26 to 50	8
51 to 90	13
91 to 150	20
151 to 280	32
281 to 500	50
501 to 1 200	80
1 201 to 3 200	125
3 201 to 10 000	200

Acceptable levels of defect should be agreed between the purchaser and the manufacturer. Guidance on acceptable levels is given in the annex.

6.3 Ultrasonic tests

As an alternative to the radiographic test, the sockets shall be subjected to ultrasonic tests. In such cases, the test method and the acceptable levels of defect shall be the subject of agreement between the purchaser and the manufacturer.

Annex

Radiographic tests — Examples of acceptable levels of defect

A.1 Acceptable levels of defect for sections up to and including 51 mm

Socket fork and junction	— Severity level 1 for cracks and tears Severity level 2 for other defects
Socket basket	— Severity level 1 for cracks and tears Severity level 3 for other defects

A.2 Acceptable levels of defect for sections over 51 mm up to and including 114 mm[1)]

Category	Description	Acceptable level	
		Level	Section
A A	Gas porosity Gas porosity	A 1 A 2	Fork and junction Basket
B B	Sand and slag inclusion Sand and slag inclusion	B 1 B 2	Fork and junction Basket
C C	Type 1 shrinkage Type 1 shrinkage	C1 1 C1 2	Fork and junction Basket
C C	Type 2 shrinkage Type 2 shrinkage	C2 1 C2 2	Fork and junction Basket
C C	Type 3 shrinkage Type 3 shrinkage	C3 1 C3 2	Fork and junction Basket
D D	Cracks Cracks	Not permissible CC 2	Fork and junction Basket
E E	Hot tear Hot tear	— EA 2	Fork and junction Basket
F F	Inserts Inserts	— EB 1	Fork and junction Basket

[1)] In accordance with ASTM E 186-75, *Standard reference radiographs for heavy-walled (*2 *to* 41/2 in *(*51 *to* 114 mm*)) steel castings*.

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